

U.G. 2nd Semester Examination - 2024**BOTANY****[MAJOR]****Course Code : BOT-MJ-T-02****(Biomolecules and Cell Biology)****[NEP-2020]**

Full Marks : 40

Time : $2\frac{1}{2}$ Hours*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer any **five** questions : 2×5=10
- i) Name two distinguishing features of B-DNA and Z-DNA.
 - ii) Name two bases of t-RNA which are usually not present in RNA.
 - iii) What is GERL complex? State its functions.
 - iv) Differentiate between a nucleoside and nucleotide.
 - v) What is the chemical formula of Disulphide Bridge found in proteins?
 - vi) What are oligosaccharides? Give example.

[Turn over]

vii) What are essential fatty acids? Give examples.

viii) What are the differences between co-enzyme and prosthetic group?

2. Answer any **two** questions : $5 \times 2 = 10$

i) How do pH and temperature variations affect the function of a catalytic protein? What are the characters of secondary and tertiary structure of a protein? $2+3=5$

ii) Describe the biogenesis of cytoplasmic ribosomes in eukaryotes describing the processing of 45sRNA. 5

iii) Describe the ultra structure of Nuclear pore complex describing the channelling of molecules across it. $4+1=5$

iv) What do you understand by the concept of "Lipid fluidity" within plasma membrane? What factors are responsible for lipid fluidity, lipid mobility across membranes? $3+2=5$

v) Describe the mechanisms of Active Transport of ions across membranes. What are receptors? $4+1=5$

vi) Describe the origin and functions of Golgi apparatus. $3+2=5$

3. Answer any **two** questions : $10 \times 2 = 20$

i) Explain the Michaelis-Menten approach to Enzyme Kinetics. What is the relationship between $V_{\max}$ and K_m ? What is allosteric modification? $6+2+2=10$

ii) Describe the role of cyclins and Cdks in regulation of cell cycle progression. Give the idea of various check points in cell progression. How do phosphorylation and dephosphorylation control different phases of cell cycle?

$4+3+3=10$

iii) What are oxidative and substrate-level phosphorylations? Describe the synthesis of ATP in mitochondria. What is chemiosmotic-coupling hypothesis of ATP synthesis?

$4+4+2=10$

iv) What is nucleosome? Describe the origin and evolution of eukaryotic cellular assembly under the light of Endosymbiosis. $2+8=10$